3FLEX™ SPC-7100

Stereo Platform Controller

User Manual

v0.0.1 – December 5th, 2011

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Revision History

Revision	Date	Authors	Changes
0.0.1	Dec 5rd, 2011	MaBe	Initial Draft: basic documentation for cert purposes. Derived from SPC7000-UserManual_0.0.1.doc

Intended Readers

Users, Operators, System-Integrators

Subject

How to use the SPC-7100

Document Version/Date

v0.0.1 – December 5th, 2011

Applicable for Device Version

All devices

Filename

SPC7100-UserManual_0.0.1.doc

Preface

This document contains instruction and reference information for the operation and use of the

3FLEX™ SPC-7100 Stereo Platform Controller

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3FLEX™ SPC-7100 Stereo Platform Controller User Manual

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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Class rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference which the user will be required to correct at his expense. To assure continued compliance follow the attached installation instructions and do not make any unauthorized modifications.

European Commission (EC)
Waste Electrical and Electronics Equipment (WEEE) Directive

Do not dispose of this device. At the end of its life-cycle, this device must be properly recycled by a specialized recycling firm or returned to the manufacturer or vendor for proper disposal.

Finland

Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan.

Norway

Apparatet må tilkoples jordet stikkontakt.

Sweden

Apparaten skall anslutas till jordat uttag.

WARNING:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

CAUTION:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD AND ANNOYING INTERFERENCE, USE THE RECOMMENDED ACCESSORIES ONLY.

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- Our Customer Support Representatives are available to provide telephone support during business hours (M-F, 9am-6pm Pacific Time), and after these hours for urgent "emergency" technical support.
- Customer Support will be provided only for products under warranty or those covered under a valid Support Agreement.
- Before returning the Product for repair, it is necessary to obtain a Return Merchandise Authorization (RMA) number by calling (818) 333-3000. You will be asked to provide the system's serial number.
- The non-functioning part should be properly packed and shipped pre-paid to 3ality Digital with the RMA number clearly displayed on the outside of the package and on the accompanying RMA form. We will refuse to accept any package without a valid RMA number.
- Repairs outside the scope of the Limited Warranty require a valid and valid Support Agreement prior to any repairs. 3ality Digital does not offer time and materials based repair services.

2 Introduction

2.1 Purpose and Scope of this Manual

This manual describes mainly the physical aspects, hardware and the connectors of the 3FLEX™ SPC-7100 and its specific features. The software aspects and menu structure are currently not deeply covered and will be subject of a different document.

2.2 Description

The 3FLEX™ SPC-7000 is a small device intended for indoor use and installation on a 3FLEX Stereo Camera Platform, on a grip equipment or on a tabletop. It can be powered through the 3Flex ControlChain, preferably through the Stereo Camera Platform (Rig), or alternatively through a suitable 3FLEX SIP Stereo Image Processor or a separate power-supply.

2.3 Overview

The 3FLEX™ SPC-7100 is a controlling device for 3alityTechnica's range of Stereo Camera Platforms and interface-box for a vast variety of digital peripheral devices, digital hand-controllers (demands) for Lens-related parameters, such as Focus (F), Iris (I) and Zoom (Z), as well as 3D-related degrees of freedom, such as Convergence (Cv) and Interaxial (IA) distances. Beyond these main tasks, the SPC-7100 seamlessly integrates with 3FLEX™ Stereo Image Processors (SIP's) and other 3FLEX™ and 3SPACE™ products.

2.4 Main Tasks of the 3FLEX™ SPC-7100

The 3FLEX™ SPC-7100 Stereo Platform Controller is the successor of the very popular 3FLEX™ SPC-5000 and closely related to the 3FLEX™ SPC-7000 Stereo Platform Controller. Compared to the SPC-7000, the SPC-7100 dos not have any analog interfaces and no local user-interface, with the significant benefit of a drastically reduced form-factor. The main tasks of the SPC-7100 include:

- Communication-Link in the 3Flex-ControlChain
- Input: Non-metrical FIZAC reference values (from handcontrollers or SIPs)
- Calculating the triangulations for up to 4 x 3D-motors
  Convergence, Baseline -> $Frontrail_L$, $Frontrail_R$, $Backrail_L$, $Backrail_R$
- Paired control of the 6 lens motors
  $Focus_L$, $Focus_R$, $Iris_L$, $Iris_R$, $Zoom_L$, $Zoom_R$
- Compensation of geometric errors (lenses, rig)
  $Frontrail_L$, $Frontrail_R$, $Backrail_L$, $Backrail_R$, Height/Pitch-$Frontrail_R$, H/P-$Backrail_R$
- Generation of metrical metadata (FIZAC)
- Handling of calibration data for the rig and lenses

2.5 Main Aspects and Overview

Figure 1. 3Flex SPC-7100: Top View

The most prominent side of the 3FLEX-SPC7100 is the top. Here, the SPC carries all labels for the connectors, which are located on both the left and right side of the unit, as depicted in the following photos:

Figure 2. 3Flex SPC-7100: Left and Right Side View

Most of the connectors are color-coded the speed-up reliable installation. Detailed connector description is provided in the specification-section of this document. However, we strongly recommend the following guidelines:

1. To avoid EMI/RFI issues, please use shielded cables only.
2. We highly recommend only usage of cables, which were purchased or certified through 3ality. This guarantees a maximum of ease-of-use, compatibility, shielding, signal-integrity, as well as proper color-coding and labeling.
3. Always make sure that the connector-type and pin-count and color-code of the plug on the cable matches those of the receptacle on the SPC, that you are intending to plug the cable into. Failing to do so will very likely mechanically damage the connectors, and electrically damage the devices that you want to interconnect.

2.5.1 Status-LED's

Next to the LEMO connectors on the left side of the SPC-7100, Status-LED's have been placed.

There is one bi-color LED located next to the 10pin LEMO connector with blue color-code, labeled "COM OUT". The meaning of this LED is as follows:

RED =	3FLEX ControlChain in rig direction: Receive Data Error
YELLOW =	3FLEX ControlChain in rig direction: Legacy Mode
GREEN =	3FLEX ControlChain in rig direction: Valid Data Received
OFF =	3FLEX ControlChain in rig direction: No Receive Data

Next to each of the 8pin LEMO connectors with black color-coding, labeled "Digital 1" and "Digital 2", red LED's have been located. The meaning of these LED's is as follows:

OFF =	Port Inactive (not used)
SOLID RED =	Port Comm Error
FLICKERING RED =	Port Communicating

2.6 3FLEX™ ControlChain

The current topology of the SIP/SPC/Rig-control is a daisy-chain, called 3FLEX-ControlChain:

SIP --- SPC[n] --- … --- SPC[0] --- MRCU (RIG)

In this chain there can be one SIP and one Stereo Camera Platform (Rig), and multiple link-devices between SIP and Rig. These links are typically 1 or 2 SPC´s (SPC-7000 and/or SPC-7100), but also other devices such as the 3FLEX-3WM7000 or 3FLEX-SNU7800 are thinkable.

The transmission parameters for the entire chain are 115.2 kbps, n, 8, 1. In rare cases, with legacy firmware running on the MRCU in the rig, the transmission parameters for the last link of the chain - between SPC[0] and MRCU - are 125 kbps, n, 9, 1.

The communication between SIP and closest SPC can be either RS422 or RS232.

The communication between all other SPC's and the Rig is RS422.

RS232 cabling should not exceed a length of about 5..10 meters.

3ality has tested RS422 communications with lengths up to 50m but this is clearly not the maximum. However, the longer the cables get, the more important it is to use the right cable (Twisted pair, impedance about 100...120 Ohms) and the right conductors twisted. You should make sure that the following pin-pairs are twisted, if the length exceeds about 25 m: 3+4, 5+6, 8+9, 1+7. The cable should be shielded and the shield should be connected to the LEMO connectors shell.

Also, it is important to know, that Power for the SPC's is usually fed through the 3FLEX ControlChain cables. It must be ensured that the voltage-drop on pins 1, 2, 9, 10 is not excessive.

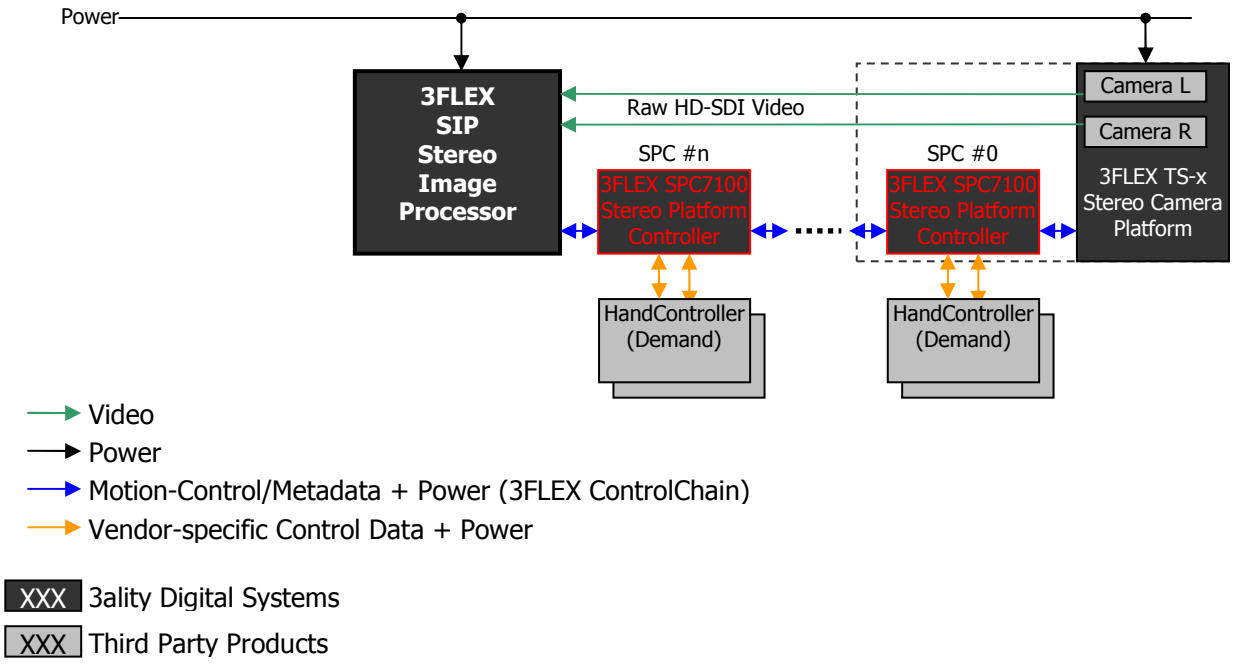


Figure 3. Typical In-System Configuration

2.7 3FLEX-SPC 7100 Internal Power Schematics

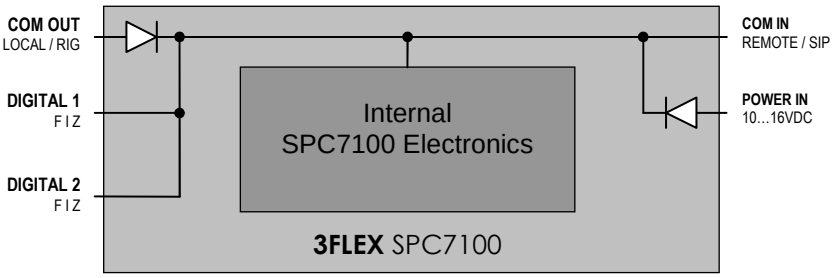


Figure 4. 3FLEX SPC7100 Internal Power Schematics

Normally, the SPC is powered by the Stereo Camera Platform (rig) through the COM OUT connector. Power can be passed trough to other SPC´s in the 3FLEX ControlChain through the COM IN connector. However, power can be supplied from either of the LEMO10 connectors, that means that the SPC can be also powered through the COM IN connector. A high-performance schottky-diode has been added internally to the design of the SPC7100, as depicted above, to prevent current flowing back to the rig. This means, that if an SPC is powered through the COM IN connector, it cannot pass power to consumers on the 3FLEX ControlChain, which are on the COM OUT side of the SPC.

If the SPC7100 is neither powered through the rig, nor through the SIP, it can be powered through the receptacle, that mates with a 2,1mm Switchcraft barrel-connector and is labeled "POWER IN". The SPC-7100 comes with a universal Power-supply for this purpose; 3ality highly recommends you to use only this provided power-supply.

3 Before you start

3.1 General Safety

1. Operating may be done by qualified and trained personnel only.
2. Read these instructions.
3. Keep these instructions.
4. Heed all warnings.
5. Follow all instructions.
6. Do not use this apparatus near water.
7. Clean only with dry cloth.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not operate outdoors in direct sunlight or in moist or rainy weather. Use appropriate covers in case of moist or wet weather-conditions!
10. Do not defeat the safety purpose of the polarized plug. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
11. Protect all cables from being walked on or pinched.
12. Do not block venting holes.
13. Use only in ventilated and dry environment.
14. Only use attachments/accessories specified by the manufacturer.
15. Unplug this apparatus during lightning storms or when unused for long periods of time.
16. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply, its cord or its plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

3.2 Specific Safety

CAUTION: Please make sure that nobody, neither you, nor a colleague, nor a spectator, is touching the Stereo Camera Platform (Rig) which is attached to the SPC, while you are operating or configuring the SPC or attached hand-controllers. The Stereo Camera Platform might move rapidly during operation through the SPC, which might be harmful. Always beware of pinch-points on the Stereo Camera Platform, especially when the SPC is directly mounted onto the Stereo Camera platform!

3.3 Additional Notes

1. To avoid EMI/RFI issues, please use shielded cables only.
2. We highly recommend only usage of cables, which were purchased or certified through 3ality. This guarantees a maximum of ease-of-use, compatibility, shielding, signal-integrity, as well as proper color-coding and labeling.
3. Always make sure that the connector-type and pin-count and color-code of the plug on the cable matches those of the receptacle on the SPC, that you are intending to plug the cable into. Failing to do so will very likely mechanically damage the connectors, and electrically damage the devices that you want to interconnect.

4 Device Configuration

4.1 Remote Device Configuration

Unlike with the SPC-7000, the only method of configuring the SPC-7000 is remotely, through the 3FLEX ControlCenter Software. This powerful software is used to configure the entire range of 3FLEX products and is subject of separate documents.

4.2 Firmware Upgrade

The SPC-7100 is designed and built around two powerful microprocessors. The firmware is constantly improved and the SPC-7100 can be upgraded in-field through the 3FLEX-ControlChain. Please contact 3ality's support for advice whether a firmware-upgrade might make sense for you and how to obtain it. Your 3ality support-team will provide you with the 3FLEX FirmwareManager and with upgrade instructions on demand.

5 Specifications

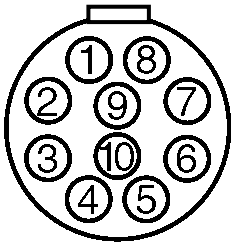
5.1 Physical

Approximate Dimensions	L = 92 mm or 3,7” W = 70 mm or 2,8” H = 30 mm or 1,2”
Weight	210 grams, or 7,5 oz
Operating Height	0...2000m (0…6500ft) above sea level
Operating Conditions	Temperature 0 °C to 45 °C or 32 to 113°F Rel. Humidity 20% … 80% (non condensing)
Storage Conditions	Temperature -10 °C to 55 °C or 15 to 131°F Rel. Humidity 0% … 80% (non condensing)
Power-supply	12V DC • 1Amax
Tolerance of Power-Supply	10…16V DC
Ingress protection	IP20. Designed for indoor usage only! If used outdoors, use appropriate protection measures to prevent exposure of the device to moisture and rain!
RoHS compliance	YES

5.2 Connectors and Interfaces

5.2.1 Left 1: 3Flex ControlChain: COM OUT, Local/Rig

10 PIN Lemo, size 1B, Blue Color-Coding
(top left)
Use to connect ro Rig, or a loop-through to additional SPC-7100



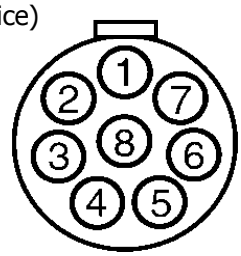
Female Receptacle - View on SPC

Pin:	Function:
1	+12V Raw to SPC from Rig, fused at 1.35A
2	Ground Common to/from SPC
3	RS-422 RA+ to SPC from Rig
4	RS-422 RB- to SPC from Rig
5	RS-422 TA+ from SPC to Rig
6	RS-422 TB- from SPC to Rig
7	unused
8	unused
9	+12V Raw to SPC from Rig, fused at 1.35A
10	Ground Common to/from SPC

5.2.2 Left 2/3, DIGITAL-1/-2, F I Z

8 PIN Lemo, size 1B, Black Color-Coding
(2nd and 3rd from top left)
Use to connect a Preston PPA(HU3), or Preston HU2(FIZ2), or Canon or Fujinon Digital Focus/Zoom Demand

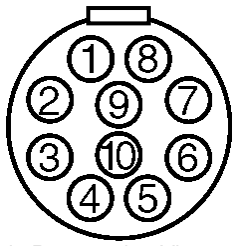
Pin:	Function:
1	+12V Raw from SPC, fused at 900mA (if required to power external device)
3	RS-232 RxD to SPC
4	RS-232 TxD from SPC
5	RS-422 TB- from SPC
6	RS-422 TA+ from SPC
7	RS-422 RB- to SPC
8	RS-422 RA+ to SPC



Female Receptacle - View on SPC

5.2.3 Right 1: 3Flex ControlChain: COM IN, Remote/SIP

10 PIN Lemo, size 1B, Blue Color-Coding
(top right)
Use to connect a SIP or a loop-through to additional SPC-7100



Female Receptacle - View on SPC

Pin:	Function:
1	+12V Raw from SPC, fused at 900mA
2	Ground Common to/from SPC
3	RS-422 TA+ from SPC
4	RS-422 TB- from SPC
5	RS-422 RA+ to SPC
6	RS-422 RB- to SPC
7	RS-232 TxD from SPC (to SIP)
8	RS-232 RxD to SPC (from SIP)
9	+12V Raw from SPC, fused at 900mA
10	Ground Common to/from SPC

5.2.4 Right 2: Power In

External Power Input 12 (10…16) VDC, 1Amp max.
(2nd from top right)
Switchcraft 722A barrel-receptacle
Mating plug: Switchcraft S761K barrel connector with lockring-nut.
Barrel diameter: 5.5mm / 0.38”; Inner diameter: 2.1mm / 0.08”

Pin:	Function:
1	External Power Input 12 (10…16) VDC, 1Amp max.
2	Ground Common

6 Appendix

6.1 Declarations of Conformity

6.1.1 CE

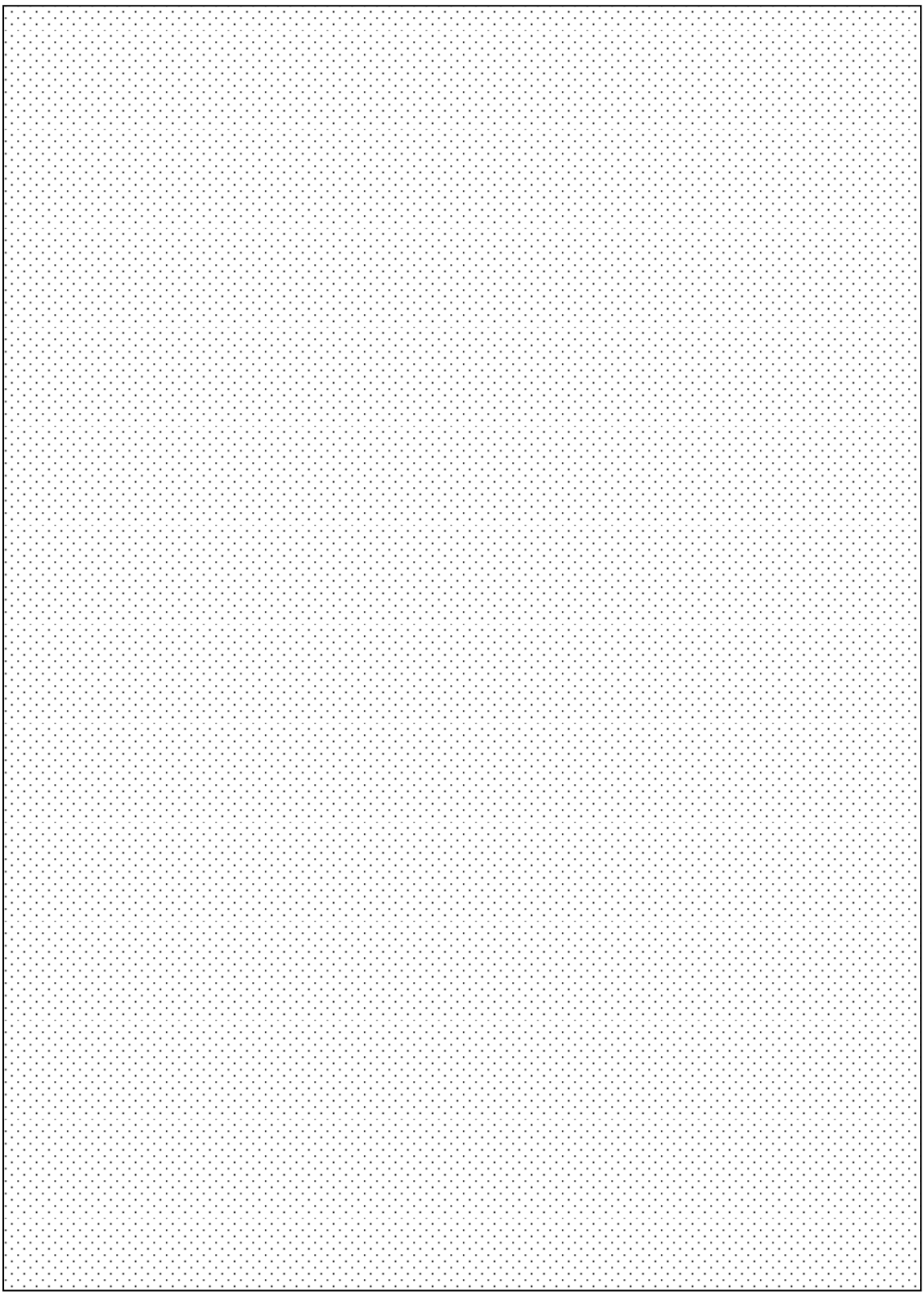


Figure 5. CE Declaration of Conformity

6.2 SPC7100 Cabling

6.2.1 Cabling Overview

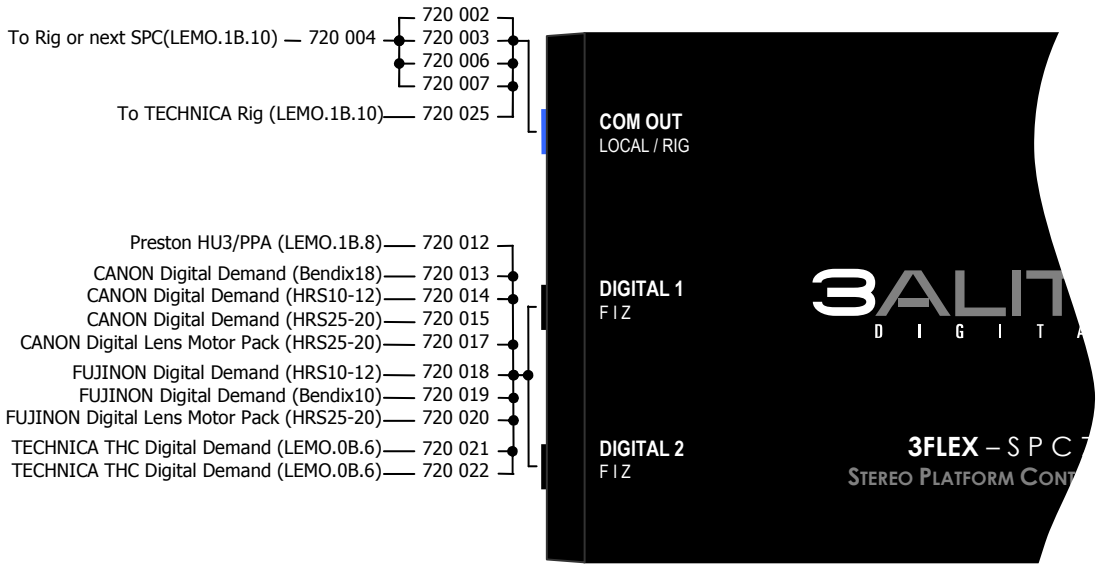


Figure 6. SPC Left Side Cabling Options

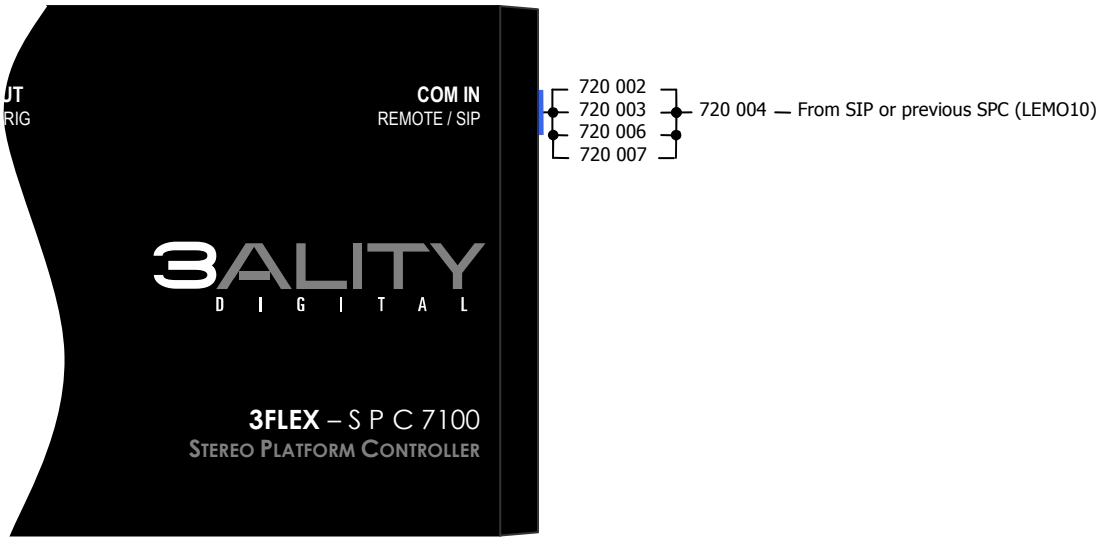


Figure 7. SPC Right Side Cabling Options

6.2.2 3ality Cables

PartNo	Description	Comment
720 002	40cm Lemo10/blue 3Flex-ControlChain Systemcable	2x Lemo10-1B plugs, straight, blue, 40cm
720 003	10m Lemo10/ blue 3Flex-ControlChain Systemcable	2x Lemo10-1B plugs, straight, blue, 1000cm
720 004	40cm Cable-Coupler Lemo10/Lemo10/blue. Optional to link two 3FlxControlChain cables	2x Lemo10-1B jacks, straight, blue, 40cm
720 006	50m Lemo10/ blue 3Flex-ControlChain Systemcable	2x Lemo10-1B plugs, straight, blue, 5000cm
720 007	1,0m Lemo10/ blue 3Flex-ControlChain Systemcable	2x Lemo10-1B plugs, straight, blue, 100cm
720 012	SPC7000-PrestonHU3/PPA cable: 2xLemo8, black, 70cm	2x Lemo8-1B, straight, black, 70cm
720 013	SPC7000-CanonDigitalDemand(Bendix) cable: Bendix14/18-Lemo8, black, 150cm	RS422
720 014	SPC7000-CanonDigitalDemand(Hirose10-12) cable: Hirose10-12-Lemo8, black, 150cm	RS422
720 015	SPC7000-CanonDigitalDemand(Hirose25-20) cable: Hirose25-20-Lemo8, black, 40cm	RS422
720 017	SPC7000-CanonDigitalLensPack(Hirose25-20) cable: Hirose25-20-Lemo8, black, 70cm	RS422
720 018	SPC7000-FujinonDigitalDemand(Hirose10-12) cable: Hirose10-12-Lemo8, black, 40cm	RS485; L2A Protocol
720 019	SPC7000-FujinonDigitalDemand(Bendix12/10) cable: Hirose10-12-Lemo8, black, 40cm	RS485; L2A Protocol
720 020	SPC7000-FujinonDigitalLensPack(Hirose25-20) cable: Hirose25-20-Lemo8, black, 70cm	RS232; L10 Protocol
720 021	SPC7000-ET Handcontroller, Lemo0B.6p, Lemo1B.8p, 300cm/10ft	RS232
720 022	SPC7000-ET Handcontroller, Lemo0B.6p, Lemo1B.8p, 1500cm/50ft	RS232
720 025	SPC7000 (Lemo.1B.10 Blue) <-> Technica ControlBox (Lemo.1B.10 Orange), 0.6m	RS422, Power

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